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URGENT PROBLEMS IN PERFECTING THE TECHNICAL EQUIPMENT OF CITY TELEPHONE COMMUNICATIONS

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The resolution of the July Plenum of the TsK KPSS pointed the way to a further rise in our socialist industry and technical progress and to the improvement of production organization in all branches of the national economy of the USSR. In the light of this resolution special importance attaches to a whole series of problems whose successful solution will to a large degree facilitate the improvement of the technical equipment of city telephone communications.

Which of these problems are the most important?

Of these problems we must first consider the production of small ATS's [automatic telephone exchanges] with remote power supply and centralized control. At the present time the Moscow City Telephone Network (MGTS) includes a large number of automatic telephone exchanges of small capacity (1,000-2,000 numbers) installed in large dwellings. It must be assumed that in the future such decentralization of exchange equipment will be achieved on a much wider scale, not only in Moscow but in other cities as well. Meanwhile, the need for maintenance personnel at these exchanges somewhat lowers the effectiveness of their introduction. The development of unattended ATS's must be concluded in the near future, after which they must be put into series production in the shortest possible time.

Of no less importance is the development of direction switches (PN) which fully serve their intended purpose. These instruments must be used in the installation of satellite ATS's (remote units) with considerable intra-exchange loading. In particular, direction switches have been installed in two satellite exchanges of the MGTS, the Tushin and Kuntsev exchanges. However, in the process of operation it developed that there were substantial defects in the circuitry of the direction switches produced by the industry. In order to eliminate these defects it was necessary to remove the call finders from the PN, which in turn eliminated the possibility of full utilization of the installed capacity of the satellite ATS's. It is necessary to take every step to speed the production of new direction switches which meet all the technical demands placed upon these devices.

It is now necessary to organize the series production of the RSL [junction line relay] assemblies with translation of the interaction signals and pulse correction developed by LONIIS [Leningrad Oblast Scientific Research Communications Institute]. This will considerably facilitate improvement of communications along inter-exchange junction lines of great length, for the generally used RSL may not always provide reliable transmission of the pulses.

In large networks conversion of all inter-exchange junction lines to the two-wire system is assuming vast importance. It is necessary that there soon be developed and introduced two-wire RSL's to link ATS's with the intercity telephone exchange, to interconnect mechanical ATS's and to connect step-by-step ATS's and mechanical ATS's. The two-wire RSL's developed by TsNIIS [Central Scientific Research Institute of

Communications] to link step-by-step ATS's is only a partial solution of the overall problem of converting from three-wire junction lines to two-wire junction lines. STAT

Increasing the efficiency of subscriber lines is also included among the current tasks in the field of city telephone communications. There are two generally accepted methods for the most effective use of subscriber lines. The first of these is the introduction of house (group) installations. There is at present in experimental operation a model of the house (group) installation with a capacity of 100 subscriber lines. This installation was created by the Laboratory for Technical Problems of Wire Communications of the Academy of Sciences USSR in cooperation with the Moscow Electrical Engineering Institute of Communications. The installation is a relay-type ATS powered by the a-c main, hence the exchange layout includes a rectifier and voltage regulator. In case of failure of the a-c supply the originating junction lines are automatically connected to the earlier mentioned subscriber lines. It is still too early to draw any conclusions concerning the results of operation of the model.

The second method of combining subscriber lines, previously in practical use in city telephone networks, consists of an arrangement of paired telephones. Regrettably, for one reason or another, industry does not now produce the lockout devices necessary for this purpose, since there is great need for them.

Along with the development and production of new models of telephone equipment it is necessary to improve the equipment presently produced by industry. The workers of the MGTS are doing much to improve the existing equipment and to eliminate individual defects in it. Thus, in the process of operation it developed that, due to faults in their circuitry and design, the IIP1 [II preselector] and the SI [secondary line switch] (of the ShI-17 [step-by-step finder] type) are the source of a considerable number of incorrect connections. In order to improve the operation of these devices we are converting from the "economical" scheme of output connection to the scheme of partial connection (by step). At the same time some rotary line switches (ShI-17) are being replaced by relay line switches (RSI-6).

At one of the rayon exchanges all forms of GI [pulse quencher] circuits are being changed so that free movement of the wipers may be achieved with a four-bank contact system. Thereby it is proposed to eliminate the possibility of incorrect connection due to overlapping of adjacent commutator segments in the GI racks. Upon conclusion of the above work MGTS will conduct appropriate inspections and, if the results warrant, will proceed to conversion of the GI circuits at all rayon ATS's.

In order to meet the need for rapid service, after obtaining the appropriate semifinished products from industry, it is planned to install nine-relay RSL assemblies of interexchange equipment.

Also of extreme importance is the matter of providing rayon ATS's with test equipment, especially such equipment as will permit completely automatic testing of exchange equipment and which is not yet in production. Only to a certain degree has this problem been eliminated by the leading engineers and technicians of the production laboratory and telephone units of MGTS. The engineering-technical personnel of the Moscow network have developed several models of test instruments, including an instrument for testing the registers of interexchange equipment, an automatic digit selector for ATS instruments, an instrument for semiautomatic checking of outputs, an automatic subscriber unit for step-by-step ATS's, an individual control register, et al

The network has no instruments by means of which the outputs from IIGI racks of step-by-step ATS's and from incoming call junctions to mechanical ATS's may be checked; nor does it have instruments for testing two-wire RSL's, PN's, IV's [call finders], or for automatic testing of interexchange junction lines.

The test equipment produced by industry in accordance with the approved list does not permit all types of testing. In this connection the workers of operating enterprises have had to create new test instruments. As a consequence the work sites have test instruments differing in circuitry, quality, and cost. When development of an instrument is concluded there remain the problems of its layout, of obtaining the necessary semifinished parts and components, etc. All this so complicates the manufacture of test equipment that many months and often years will pass before it is in operation.

It is necessary that a "course" of origination and manufacture of test equipment be radically changed. The development of test equipment, especially for automatic testing, should be placed entirely in the hands of the scientific research institutes and design bureaus. The manufacture of this test equipment must be completely in the hands of industry. Upon the development of one or another instrument the Ministry of Communications USSR must inspect it, approve it for series production, and include it in the body of equipment furnished by industry. This will insure all city telephone networks an adequate assortment of high-quality test equipment, will lower the cost of producing that equipment, and will free operational personnel from functions which are not properly theirs.

It is necessary to dwell further on one problem of no little significance. We still do not have a single method of determining the traffic between ATS's and junctions. In designing new ATS's in large regionalized networks the workers of design organizations, not having a scientifically based procedure, resort to a method of calculation not always providing the requisite accuracy or rely upon their own intuition. As a result, such practices often lead to a deficiency of interexchange junction lines and mechanisms in some directions and to an excess of the same in other directions. This brings to mind the fact that TsNIIS, engaged for several years in developing the above mentioned procedure, has not yet brought the matter to an end, and upon encountering difficulties, work in this direction was practically stopped. Such an outcome is inadmissible; it is necessary not only to continue this work but also to push it forward by every possible means.

Numerous problems exist also in the field of line equipment for the city telephone networks. We will point out the more pressing of these problems.

Determining the location of a fault in the lead sheathing of a cable by a sufficiently effective method has become a real problem. The required results are not provided by the method of checking the hermetic condition of a cable sheath with the aid of soap, which method has been employed now for decades. Each year in the spring and fall individual cables become inoperative because every step was not taken to discover openings in their sheaths. The Moscow network has been unable to arrive at a satisfactory solution of the problem. Regretably, TsNIIS, which it is known is called upon to assist in improving communications work of all kinds, has not yet spoken its weighty word on this problem. Meanwhile, the operating personnel of the city telephone networks and communications construction workers, using the old, ineffective methods, are forced to expend much energy, time, and funds in checking the hermetic condition of cable sheathing.

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In the Soviet Union at the present time telephones are produced by two plants, and it would appear that the requirements placed on them would be fully met. Actually, this is far from being the case. Both plants produce only desk phones. Why the production of wall phones has become a problem is completely incomprehensible. The urgent requests of the Moscow communications workers for the production of wall phones have met with no results. Is it indeed impossible to organize at one of the plants the production of wall phones in sufficient quantity for the city telephone networks of the whole Soviet Union? The need for such telephones is extremely great, especially in the installation of telephones for collective use in dwelling places. This problem must be solved by industry in the shortest time.

There are great grievances also with regard to quality of the telephones produced. According to technical specifications, the digit selector of the telephone of the VEF plant must be able to withstand a total of only 100,000 dialings of the digit 0. In the technical specifications for the new telephone the number of dialings of the digit zero has been increased to 500,000, but this too is insufficient. It must be brought up to 1,000,000 at least.

The quality of the handset cords does not satisfy the operational workers. According to technical requirements, the handset cord must withstand 125,000 flexures with simultaneous twisting without breaking the conductors. The quality of the cord must be determined not only by how much flexure it can withstand but also by the accompanying increase in resistance of the conductors and whether the noise arising from this will exceed the permissible value.

The principal shortcoming in the automatic telephones of the AMT type [pay phones] produced by industry lies in the unstable operation of the block digit selectors. According to technical specifications, the latter must be able to withstand 200,000 diallings (at the plant) from 0 to the finger stop. If it is considered that the directory number of a subscriber of the Moscow network consists of six elements and that from one automatic telephone up to 500 calls are made in a 24-hour period, then under the conditions in MGTS the digit selector will normally operate over a period of approximately 60 days. This is clearly inadequate. The requirements for digit selectors must be sharply increased so that industry can guarantee at least 1,000,000 dialings.

Providing the rayon ATS's with special testboards which permit checking the operation of automatic telephones will make possible a considerable increase in the quality of communications achieved by automatic telephones. While no one will dispute this point, nothing is being done to provide automatic telephone exchanges with the above mentioned testboards. Up to this time the industrial production of these testboards has not been mastered. As a result, in all the city telephone networks of the Soviet Union there are but two of the testboards: one in Moscow installed according to a scheme proposed by a Moscow engineer, and one in Leningrad installed according to a scheme proposed by a Leningrad engineer. The Technical Administration of the Ministry of Communications USSR must immediately examine the circuits of these testboards, approve one of them, turn it over to industry, and achieve the manufacture of this needed equipment in amounts meeting the requirements of the city telephone networks of the Soviet Union

Data show that a considerable number of faults occur at cable terminal installations, especially at cable boxes and 10 pair distribution

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vaults. It must be pointed out that no substantial modernization has been achieved in this equipment, which has been maintained in its old constructional make-up for several decades. It has long been necessary to create a new, more convenient design of cable box and distribution vault with the terminals reliably protected against dampness.

In conclusion, I say a few words about providing the city telephone networks with spare parts for equipment and instruments. The situation with regard to supplying spare parts is clearly bad. Certain components are not obtained by the telephone networks at all, others are delivered in insufficient quantities. This obliges operational enterprises to make the components on their own premises without considering the cost. This has been the case with MGTS, though it costs the state a pretty penny. For example, the gate of the coin duct (No 8960104) and the baffle plate of the coin receptacle (No 8910138) for the AMT type of automatic telephone cost 32 and 33 kopeks, respectively, according to plant prices, but according to the calculations of the central shops of MGTS the costs are 1 ruble 33 kopeks, and 4 rubles 82 kopeks. The causes of such considerable differences in cost are apparent: the manufacture of components in small quantity inevitably increases the cost per unit of production. As soon as possible industry must produce the entire assortment of spare parts in the required amounts and the operational enterprises must be freed from homemade manufacture with their own personnel.

Rapid solution of the problems dealt with in the present article will undoubtedly facilitate a sharp increase in the quality of city telephone communications.

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